

Preliminary Technical Data

ADG719

FEATURES

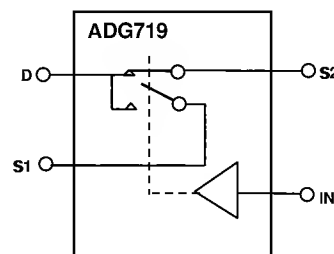
+1.8V to 5.5V Single Supply
2Ω On Resistance
Bandwidth 100MHz
Rail to Rail Operation
Very Low Distortion
6-lead SOT-23, 8-lead μSOIC Packages
Fast Switching Times
 t_{ON} 20 ns
 t_{OFF} 10 ns

Low Power Consumption (1μW)
TTL/CMOS Compatible

APPLICATIONS

Battery Powered Systems
Communication Systems
Sample Hold Systems
Audio Signal Routing
Mechanical Reed Relay Replacement

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The ADG719 is a monolithic CMOS SPDT switch. This switch is designed on a sub-micron process which provides low power dissipation yet gives high switching speed, low on resistance and low leakage currents.

The ADG719 can operate from a single supply range of +1.8V to +5.5V making it ideal for use in battery powered instruments, and with the new generation of DACs and ADCs from Analog Devices.

Each switch of the ADG719 conducts equally well in both directions when ON. The ADG719 exhibits break before make switching action.

The ADG719 is available in 6-lead SOT-23 package, and 8-Lead μSOIC.

PRODUCT HIGHLIGHTS

1. +2V/+3V/+5V Single Supply Operation. The ADG719 offers high performance, including low on resistance and fast switching times and is fully specified and guaranteed with +3V and +5V supply rails.
2. Low R_{ON} (2Ω).
3. Bandwidth 100MHz
4. Low power dissipation
CMOS construction ensures low power dissipation.
5. Fast T_{ON}/T_{OFF}
6. Tiny 6-lead SOT-23 and 8-lead μSOIC.

PrelimF. 11/97

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Preliminary Technical Data ADG719—SPECIFICATIONS¹

ADG719

($V_{DD} = 5V \pm 10\%$, $GND = 0V$. All specifications $-40^{\circ}C$ to $+85^{\circ}C$, unless otherwise noted.)

Parameter	B Version		Units	Test Conditions/Comments
	+25°C	$-40^{\circ}C$ to $+85^{\circ}C$		
ANALOG SWITCH				
Analog Signal Range		0 V to V_{DD}		V
On-Resistance (R_{ON})		2	Ω typ	$V_S = 0V$ to 5V
		5	Ω max	
On-Resistance Match Between Channels (ΔR_{ON})			Ω typ	
		1.0	Ω max	
On-Resistance Flatness ($R_{FLAT(ON)}$)				Ω typ
		1.0	Ω max	
LEAKAGE CURRENTS				TBD
Source OFF Leakage I_S (OFF)		2.0	nA typ	
			nA max	
Drain OFF Leakage I_D (OFF)		2.0	nA typ	
			nA max	
Channel ON Leakage I_D, I_S (ON)		4.0	nA typ	
			nA max	
DIGITAL INPUTS				
Input High Voltage, V_{INH}		2.4	V min	
Input Low Voltage, V_{INL}		0.8	V max	
Input Current				
I_{INL} or I_{INH}	0.005	± 0.5	μA typ	$V_{IN} = V_{INL}$ or V_{INH}
			μA max	
DYNAMIC CHARACTERISTICS ²				
t_{ON}		20	ns max	TBD
t_{OFF}		10	ns max	
Break-Before-Make Time Delay, t_D	1	1	ns min	
Channel-to-Channel Crosstalk	85		dB typ	
Bandwidth - 3dB	100		MHz typ	
Bandwidth ± 0.1 dB	TBD		MHz typ	
Off Isolation	80		dB typ	
C_S (OFF)	TBD		pF typ	
C_D (OFF)	TBD		pF typ	
C_D, C_S (ON)	TBD		pF typ	
POWER REQUIREMENTS				$V_{DD} = +5V$ Digital Inputs = 0 V or 5 V
I_{DD}	0.0001	0.5	μA typ	
			μA max	

NOTES

¹Temperature ranges are as follows: B Versions: $-40^{\circ}C$ to $+85^{\circ}C$.

²Guaranteed by design, not subject to production test.

Specifications subject to change without notice.

ADG719—SPECIFICATIONS¹(V_{DD} = 2.7V to 3.6V, GND = 0 V. All specifications -40°C to +85°C, unless otherwise noted.)

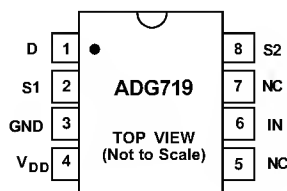
Parameter	B Version -40°C to		Units	Test Conditions/Comments
	+25°C	+85°C		
ANALOG SWITCH				
Analog Signal Range		0 V to V _{DD}		V
On-Resistance (R _{ON})		2 8	Ω typ Ω max	V _S = 0V to 3V
On-Resistance Match Between Channels (ΔR _{ON})		1.0	Ω typ Ω max	
On-Resistance Flatness (R _{FLAT(ON)})		2.0	Ω max	Ω typ
LEAKAGE CURRENTS				TBD
Source OFF Leakage I _S (OFF)		2.0	nA typ nA max	
Drain OFF Leakage I _D (OFF)		2.0	nA typ nA max	
Channel ON Leakage I _D , I _S (ON)		4.0	nA typ nA max	
DIGITAL INPUTS				
Input High Voltage, V _{INH}		2.0	V min	
Input Low Voltage, V _{INL}		0.4	V max	
Input Current I _{INL} or I _{INH}	0.005	±0.5	μA typ μA max	V _{IN} = V _{INL} or V _{INH}
DYNAMIC CHARACTERISTICS ²				TBD
t _{ON}		30	ns max	
t _{OFF}		15	ns max	
Break-Before-Make Time Delay, t _D	1	1	ns min	
Channel-to-Channel Crosstalk	85		dB typ	
Bandwidth - 3dB	110		MHz typ	
Bandwidth ± 0.1 dB	TBD			
Off Isolation	80		dB typ	
C _S (OFF)	TBD		pF typ	
C _D (OFF)	TBD		pF typ	
C _D , C _S (ON)	TBD		pF typ	
POWER REQUIREMENTS				V _{DD} = +3 V Digital Inputs = 0 V or 3 V
I _{DD}	0.0001	0.5	μA typ μA max	

NOTES

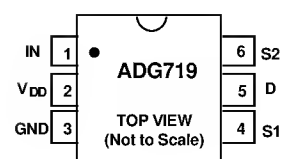
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PIN CONFIGURATION (MICRO SOIC)



PIN CONFIGURATION (SOT-23)



ABSOLUTE MAXIMUM RATINGS¹

(T_A = +25°C unless otherwise noted)

V_{DD} to GND -0.3 V to +7 V

Analog, Digital Inputs² -0.3V to V_{DD} +0.3 V or
30 mA, Whichever Occurs First

(Pulsed at 1 ms, 10% Duty Cycle max)

Operating Temperature Range

Industrial (B Version) -40°C to +85°C

Storage Temperature Range -65°C to +150°C

Junction Temperature +150°C

microSOIC Package, Power Dissipation 450 mW

θ_{JA} Thermal Impedance 206°C/W

θ_{JC} Thermal Impedance 44°C/W

Lead Temperature, Soldering

Vapor Phase (60 sec) +215°C

Infrared (15 sec) +220°C

SOT-23 Package, Power Dissipation TBD mW

θ_{JA} Thermal Impedance 229.6°C/W

θ_{JC} Thermal Impedance 91.99°C/W

Lead Temperature, Soldering

Vapor Phase (60 sec) +215°C

Infrared (15 sec) +220°C

ESD 2kV

NOTES

¹Stresses above those listed under “Absolute Maximum Ratings” may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or any other conditions above those listed in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability. Only one absolute maximum rating may be applied at any one time.

²Overvoltages at IN, S or D will be clamped by internal diodes. Current should be limited to the maximum ratings given.

ORDERING GUIDE

Model ¹	Temperature Range	Package Option ¹
ADG719BRT	-40°C to +85°C	RT-6
ADG719BRM	-40°C to +85°C	RM-8

NOTES

¹RT = SOT-23; RM = microSOIC.

CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although the ADG719 feature proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

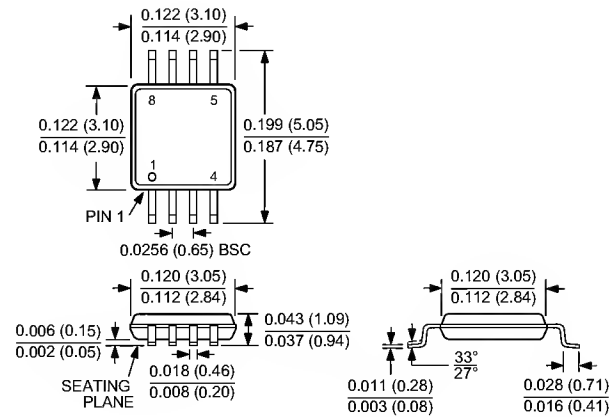
TERMINOLOGY

V_{DD}	Most positive power supply potential.
GND	Ground (0 V) reference.
S	Source terminal. May be an input or output.
D	Drain terminal. May be an input or output.
IN	Logic control input.
R_{ON}	Ohmic resistance between D and S.
ΔR_{ON}	On resistance match between any two channels i.e. $R_{ONmax} - R_{ONmin}$.
$R_{FLAT(ON)}$	Flatness is defined as the difference between the maximum and minimum value of on-resistance as measured over the specified analog signal range.
I_S (OFF)	Source leakage current with the switch "OFF."
I_D (OFF)	Drain leakage current with the switch "OFF."
I_D, I_S (ON)	Channel leakage current with the switch "ON."
$V_D (V_S)$	Analog voltage on terminals D, S.
C_S (OFF)	"OFF" switch source capacitance.
C_D (OFF)	"OFF" switch drain capacitance.
C_D, C_S (ON)	"ON" switch capacitance.
t_{ON}	Delay between applying the digital control input and the output switching on.
t_{OFF}	Delay between applying the digital control input and the output switching off.
t_D	"OFF" time or "ON" time measured between the 90% points of both switches, when switching from one address state to another.
Crosstalk	A measure of unwanted signal which is coupled through from one channel to another as a result of parasitic capacitance.
Off Isolation	A measure of unwanted signal coupling through an "OFF" switch.

MECHANICAL INFORMATION

Dimensions are shown in inches and (mm).

8-Pin microSOIC (RM-8)



6-Pin SOT23 (RT-6)

